SIEMENS

PATENT
Attorney Docket No. 2003P03809US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Inventor:	W. Bauer et al.	)	
		)	Group Art Unit: 2416
Serial No.:	10/800,209	)	
		)	Examiner: Mattis, Jason E
Filed:	March 12, 2004	)	Confirmation No. 8567

Title: A METHOD AND A JITTER BUFFER REGULATING CIRCUIT FOR REGULATING A JITTER BUFFER

Mail Stop Appeal Brief - Patent
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPELLANT'S BRIEF UNDER 37 CFR 41.37

This brief is in furtherance of the Notice of Appeal filed concurrently with this paper on December 09, 2008.

1. REAL PARTY IN INTEREST - 37 CFR 41.37(c)(1)(i)

The real party in interest in this Appeal is the assignee of the present application, Siemens Aktiengesellschaft.

2. RELATED APPEALS AND INTERFERENCES - 37 CFR 41.37(c)(1)(ii)

To the best of our knowledge, there is no other appeal, interference or judicial proceeding that is related to or that will directly affect, or that will be directly affected by, or that will have a bearing on the Board's decision in this Appeal.

3. STATUS OF CLAIMS - 37 CFR 41.37(c)(1)(iii)

Claims pending: Claims 1, 2 and 5-8.

Claims cancelled: 3-4 and 9-10.

Claims withdrawn but not cancelled: none

Claims allowed: none

Claims rejected: Claims 1, 2 and 5-8.

Claims on appeal: Claims 1, 2 and 5-8.

4. STATUS OF AMENDMENTS - 37 CFR 41.37(c)(1)(iv)

No amendments was filed by applicant after the currently pending final rejection.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER- 37 CFR 41.37(c)(1)(v)

Independent claim 1 is directed to a method for regulating a jitter buffer JP (FIG. 2) for buffering a data packet stream, such as data packets DP1-DP3. See page 2, lines 1-3 of paragraph 6 of the disclosure (substitute spec). The method allows registering a transmission delay dp due to buffering for the data packets of the data packet stream. See page 6, lines 1-4 of paragraph 21 of the disclosure. The method further allows continuously deriving weighted mean delay values from registered transmission delays, wherein a shorter transmission delay is weighted higher than a longer transmission delay. See page 7, lines 1-2 of paragraph 23 of the disclosure. See also page 6, lines 3-4 of paragraph 21 of the disclosure. A read-out speed of the jitter buffer is regulated as a function of the continuously derived weighted mean delay values so that said values are adjusted as a regulating variable to a predefined desired delay. See page 6, lines 1-7 of paragraph 22 of the disclosure. A currently registered transmission delay is compared with a previously derived weighted mean delay value. See page 7, lines 8-10 of paragraph 23 of the disclosure. A weighting of the currently registered transmission delay is

determined as a function of a result of the comparing. The currently registered transmission delay is weighted with a first predefined weight value β1 if the currently registered transmission delay is shorter than the previously derived weighted mean delay value and is weighted with a second predefined weight value β2 if the currently registered transmission delay is longer than the previously derived weighted mean delay value. The first weight value is larger than the second weight value. See page 7, lines 10-16 of paragraph 23 of the disclosure. A quotient of the first predefined weight value and the second predefined weight value is selected to define a tradeoff between a delay introduced by the jitter buffer and a data packet loss rate. See page 7, lines 7-11 of paragraph 25 of the disclosure.

Independent claim 6 is directed to a jitter buffer regulating circuit for regulating a jitter buffer JP (FIG. 2) for buffering a data packet stream, such as data packets DP 1-DP3. See page 2, lines 1-3 of paragraph 6 of the disclosure (substitute spec). The jitter buffer comprises a registration device EE for registering a transmission delay dp due to buffering of a respective data packet of the data packet stream. See page 6, lines 1-4 of paragraph 21 of the disclosure. The jitter buffer further comprises a mean-forming device ME for continuously deriving weighted mean delay values from registered transmission delays, with higher weighting of a shorter transmission delay compared to a higher transmission delay. See page 7, lines 1-2 of paragraph 23 of the disclosure. See also page 6, lines 3-4 of paragraph 21 of the disclosure. A regulating device is used for adjusting the continuously derived weighted mean delay values to a predefined desired delay by regulating a read-out speed of the jitter buffer as a function of the continuously derived weighted mean delay values. See page 6, lines 1-7 of paragraph 22 of the disclosure. A currently registered transmission delay is compared with a previously derived weighted mean delay value. See page 7, lines 8-10 of paragraph 23 of the disclosure. The weighting of the currently registered transmission delay is determined as a function of the result of the comparison. The currently registered transmission delay is weighted with a first predefined weight value β1 if the currently registered transmission delay is shorter than the previously derived weighted mean delay value and is weighted with a second predefined weight value β2 if the currently registered transmission delay is longer than the previously derived weighted mean delay value. The first weight value is larger than the second weight value. See page 7, lines 10-16 of paragraph 23 of the disclosure. A quotient of the first predefined weight value and the

second predefined weight value is selected to define a tradeoff between a delay introduced by the jitter buffer and a data packet loss rate. See page 7, lines 7-11 of paragraph 25 of the disclosure.

6. GROUNDS OF REJECTION TO BE REVIEWED UPON APPEAL - 37 CFR 41.37(c)(1)(vi)

A) Whether claims 1, 2 and 5-8 stand rejected under 35 U.S.C. 103(a) as being unpatentable over US patent application publication No. 2003/0112758 (hereinafter Pang) in view of US patent No. 6,434,606 (hereinafter Borella)..

7. ARGUMENT 37 CFR 41.37(c)(1)(vii)

A. *Regarding the rejection of claims 1, 2 and 5-8 under 35 U.S.C. 103(a) as being unpatentable over Pang in view of Borella.*

Appellant argues that the Pang/Borella combination does not constitute an appropriate *prima facie* combination for renderings claims 1, 2 and 5-8 unpatentable because it fails to describe or suggest each of the structural and/or operational relationships of the claimed invention, as discussed in greater detail below. With regard to the claim rejections, it is appellant's belief that not all of the rejected claims stand or fall together. More specifically, independent claim 1 and dependent claims stand together. However, claim 6, a distinct independent claim, should be grouped separately from claims 1-2, 5 and 7-8 for purposes of this appeal.

M.P.E.P. 2143.04 provides that to establish *prima facie* obviousness of a claimed invention, all the claims limitations must be taught or suggested by the prior art. All words in a claim must be considered for judging the patentability of the claim against the prior art. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending there from is nonobvious.

The Examiner purports that weighting factors alpha and beta of Pang are analogous to the weight values of the claimed invention. Pang describes in paragraphs 55-57 (reproduced below

in their entirety) a first approach that uses a single weighting factor alpha (α). Accordingly, as evidentiary supported by the declaration of Wolfgang Bauer (See Evidence Appendix), one skilled in the art would recognize that this first approach of Pang fails to describe or suggest an operational relationship where a quotient of the first predefined weight value and the second predefined weight value is selected to define a tradeoff between a delay introduced by the jitter buffer and reduce a data packet loss rate, as set forth in claim 1.

> **[0055]** To construct a histogram for determining the buffer size and delay, packet delays need to be determined. A plurality of methods may be used to calculate delay. In one approach, the jitter buffer system incorporates a method that uses a linear recursive filter and is characterized by the weighting factor alpha. The delay estimate is computed as:
>
> $d_i=\alpha*d_{i-1}+(1-\alpha)*n_i$
>
> **[0056]** And the variation is computed as:
>
> $v_i=\alpha v_{i-1}+(1-\alpha)|d_i-n_i|$
>
> **[0057]** where α is a weighting factor, d_i is the amount of time from when the ith packet is generated by the source until it is played out at the destination host, n_i is the total delay introduced by the network, and v_i is the variable delay experienced by packet i as it is sent from the source to the destination host.
>
> **[0058]** A second approach adapts more quickly to the short burst of packets incurring long delays by using a weighting mechanism which incorporates two values into the weighting factor, one indicative of increasing trends in the delay and one indicative of decreasing trends.
>
> **[0059]** if ($n_i>d_i$) then
>
> $d_i=\beta*d_i+(1-\beta)*n_i$
>
> **[0060]** else
>
> $d_i=\alpha*d_i+(1-\alpha)*n_i$

Pang describes in paragraphs 58-59 (reproduced above in their entirety) a second approach that uses a first weighting factor alpha (α) or a second weighting factor (β). However, under this second approach of Pang, the first weighting factor is used alone (i.e. independently of the second weighting factor) when an increasing trend in a delay is present . Conversely, the second factor is used alone (i.e. independently of the first weighting factor) when a decreasing trend in the delay is present. Consequently, as evidentiary supported by the declaration of. Wolfgang Bauer, one skilled in the art would appreciate that this second approach of Pang also fails to describe or suggest an operational relationship where a quotient of the first predefined weight value and the second predefined weight value is selected to define a tradeoff between a delay introduced by the jitter buffer and a data packet loss rate, as set forth in claim 1. The Examiner argues in terms of inherency. However, the express teachings of Pang, as noted above,

and the evidentiary basis provided by the declaration of Wolfgang Bauer, do not support an inherency theory for rejecting the claimed invention. Appellant will now proceed to discuss the Borella reference.

Borella describes a buffer management device 512 for managing a buffer array 514 made up of individual jitter buffers 531, 532 and 533. See FIG. 1 of Borella. This reference further describes selecting a computationally-desirable jitter buffer from the individual jitter buffers that make up the buffer array based on comparing the respective quality of the individual jitter buffers. See Borella col. 4, lines 3-13. See also abstract of Borella. FIG. 11, as described by Borella at col. 5, lines 3-5, merely shows a graphical representation for selecting the computationally-desirable jitter buffer in the buffer array. As would be appreciated by one skilled in the art, col. 16, line 60 et. seq. of Borella simply acknowledges a consideration that would be generically applicable to any data packet-based communication scheme. Namely, that jitter buffer evaluation is a tradeoff between packet delay, (i.e., buffer depth) packet loss, and bandwidth. More importantly, however, is the fact that Borella nowhere describes or suggests selecting a quotient of a first predefined weight value and a second predefined weight value to define a tradeoff between a delay introduced by the jitter buffer and a data packet loss rate, as set forth in claim 1. The foregoing structural and/or operational relationships are also not described or suggested by Pang, as discussed above. Accordingly, the Pang/Borella combination fails to render unpatentable the claimed invention because it fails to describe or suggest each of the structural and/or operational relationships of the claimed invention. Therefore, appellant respectfully submits that the Examiner has failed to meet the burden required to appropriately establish a *prima facie* case of obviousness.

In view of the foregoing considerations, appellant respectfully asserts that independent claim 1 is not rendered obvious by the combination of Pang/Borella. Furthermore, claims 2, 5 and 7-8, either directly or indirectly, depend from independent claim 1 and are therefore construed to contain each of the structural and/or operational relationships of claim 1. Thus, the applied combination fails to render obvious such dependent claims. Therefore, the Board is respectfully requested to withdraw the §103 rejections.

Independent claim 6 is directed to a jitter buffer regulating circuit for regulating a jitter buffer for buffering a data packet stream. Claim 6 in part recites use of a quotient of a first

predefined weight value and a second predefined weight value selected to define a tradeoff between a delay introduced by the jitter buffer and a data packet loss rate. In view of the discussion above, appellant asserts that based on the distinguishing structural and/or operational relationships respectively recited in claim 6, such a claim is also not rendered obvious by the applied combination of Pang and Borella. Therefore, appellant respectfully requests the Board to withdraw the §103 rejection of claim 6.

8. CLAIMS APPENDIX - 37 CFR 41.37(c) (1) (viii).

A copy of the claims involved in this appeal is attached as a claims appendix under 37 CFR 41.37(c) (1) (viii).

9. EVIDENCE APPENDIX - 37 CFR 41.37(c) (1) (ix)

A copy of Declaration of Wolfgang Bauer under 37 C.F.R. §1.132 is attached as Evidence Appendix under 37 CFR 41.37(c) (1) (ix).

10. RELATED PROCEEDINGS APPENDIX - 37 CFR 41.37(c) (1) (x)

None is required under 37 CFR 41.37(c) (1) (x).

Respectfully submitted,

Dated: 12/19/08

By: _____

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APPENDIX OF CLAIMS ON APPEAL

1. A method for regulating a jitter buffer for buffering a data packet stream comprising:

registering a transmission delay due to buffering for the data packets of the data packet stream;

continuously deriving weighted mean delay values from registered transmission delays, wherein a shorter transmission delay is weighted higher than a longer transmission delay; and

regulating a read-out speed of the jitter buffer as a function of the continuously derived weighted mean delay values so that said values are adjusted as a regulating variable to a predefined desired delay;

comparing a currently registered transmission delay with a previously derived weighted mean delay value;

determining a weighting of the currently registered transmission delay as a function of a result of the comparing, wherein the currently registered transmission delay is weighted with a first predefined weight value if the currently registered transmission delay is shorter than the previously derived weighted mean delay value and is weighted with a second predefined weight value if the currently registered transmission delay is longer than the previously derived weighted mean delay value, with the first weight value being larger than the second weight value, and further wherein a quotient of the first predefined weight value and the second predefined weight value is selected to define a tradeoff between a delay introduced by the jitter buffer and a data packet loss rate.

2. A method according to Claim 1, wherein a new weighted mean delay value is derived from a previously derived weighted mean delay value and a currently registered transmission delay.

5. A method according to Claim 1, wherein the regulating variable is regulated by a single regulating circuit.

6. A jitter buffer regulating circuit for regulating a jitter buffer for buffering a data packet stream comprising:

a registration device for registering a transmission delay due to buffering of a respective data packet of the data packet stream;

a mean-forming device for continuously deriving weighted mean delay values from registered transmission delays, with higher weighting of a shorter transmission delay compared to a higher transmission delay; and

a regulating device for adjusting the continuously derived weighted mean delay values to a predefined desired delay by regulating a read-out speed of the jitter buffer as a function of the continuously derived weighted mean delay values,

wherein a currently registered transmission delay is compared with a previously derived weighted mean delay value, and the weighting of the currently registered transmission delay is determined as a function of the result of the comparison,

wherein the currently registered transmission delay is weighted with a first predefined weight value if the currently registered transmission delay is shorter than the previously derived weighted mean delay value and is weighted with a second predefined weight value if the currently registered transmission delay is longer than the previously derived weighted mean delay value, with the first weight value being larger than the second weight value, and

wherein a quotient of the first predefined weight value and the second predefined weight value is selected to define a tradeoff between a delay introduced by the jitter buffer and a data packet loss rate.

7. A method according to Claim 2, wherein a currently registered transmission delay is compared with a previously derived weighted mean delay value, and the weighting of the currently registered transmission delay is determined as a function of the result of the comparison.

8. A method according to Claim 2, wherein the regulating variable is regulated by a single regulating circuit.

EVIDENCE APPENDIX

SIEMENS

PATENT
Attorney Docket No. 2003P03809US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Inventor:	W. Bauer et al.	)	
		)	Group Art Unit: 2616
Serial No.:	10/800,209	)	
		)	Examiner: Mattis, Jason E
Filed:	March 12, 2004	)	Confirmation No. 8567

Title: A METHOD AND A JITTER BUFFER REGULATING CIRCUIT FOR REGULATING A JITTER BUFFER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION OF WOLFGANG BAUER
UNDER 37 CFR 1.132

1. I, Wolfgang Bauer, a citizen of Austria, hereby declare and state as follows:

2. I have been continuously employed by Siemens Aktiengesellschaft Österreich., since December 1st, 1998. Siemens Aktiengesellschaft Österreich., is a corporate affiliate of the Assignee Siemens Aktiengesellschaft. I primarily work in the area of digital signal processing, in particular I develop digital signal processing algorithms and software for voice over IP gateways.

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From 1990 to 1998 I have worked on a number of projects in the field of digital signal processing for several companies.

3. I received a diploma (equivalent to a Master of Science in the US) in Electronics, Communications and Information Technology from the Technical University of Vienna, Austria, on March 6th 1998.

4. I understand that the USPTO Examiner has rejected claims for the above-identified application relying on US patent application No. 2003/0112758 (hereinafter Pang).

5. I have read the specification of the Pang reference and understand the contents of such specification. Furthermore, I have read the patent application of the present invention and understand its contents.

6. Pang describes in paragraphs 55-57 (reproduced below in their entirety) a first approach for determining packet delays that uses a single weighting factor alpha (α).

[0055] To construct a histogram for determining the buffer size and delay, packet delays need to be determined. A plurality of methods may be used to calculate delay. In one approach, the jitter buffer system incorporates a method that uses a linear recursive filter and is characterized by the weighting factor alpha. The delay estimate is computed as:

$$d_i = \alpha * d_{i-1} + (1-\alpha) * n_i$$

[0056]. And the variation is computed as:

$$v_i = \alpha v_{i-1} + (1-\alpha)|d_{i-1} - n_i|$$

[0057] where α is a weighting factor, d_i is the amount of time from when the ith packet is generated by the source until it is played out at the destination host, n_i is the total delay introduced by the network, and v_i is the variable delay experienced by packet i as it is sent from the source to the destination host.

[0058] A second approach adapts more quickly to the short burst of packets incurring long delays by using a weighting mechanism which incorporates two values into the weighting factor, one indicative of increasing trends in the delay and one indicative of decreasing trends.

[0059] if ($n_i > d_i$) then

$$d_i = \beta * d_{i-1} + (1-\beta) * n_i$$

[0060] else

$$d_i = \alpha * d_{i-1} + (1-\alpha) * n_i$$

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In paragraphs 58-59 (reproduced in the previous page in their entirety), Pang describes a second approach for determining packet delays that uses a first weighting factor alpha (α) and a second weighting factor (β). However, Pang does not teach how these two factors should be chosen, especially Pang does not mention any quotient $q = \alpha / \beta$ or suggests that this quotient is of any relevance. Consequently, one skilled in the art such as myself would appreciate that this approach of Pang also fails to describe or suggest an operational relationship where a quotient of the first predefined weight value and the second predefined weight value can be selected to define a tradeoff between a delay introduced by the jitter buffer (that is the average time packets stay in the jitter buffer before they are played out) and the packet loss due to packets arriving too late at the jitter buffer.

7. Moreover, one skilled in the art such as myself, would appreciate that selecting a quotient of the first predefined weight value and the second predefined weight value to define a tradeoff as described above is not a necessary and inevitable consequence from the disclosure of Pang. Consequently, the disclosure of Pang does not inherently teach or suggests to one skilled in the art, an operational relationship where a quotient of the first predefined weight value and the second predefined weight value is selected to define a tradeoff between the delay introduced by the jitter buffer and the packet loss rate, as set forth in the claimed invention.

8. As will be readily understood by one skilled in the art such as myself, the following figure shows in a straightforward manner the dependency of the delay estimation on the quotient $q = \frac{\alpha}{\beta}$, with $\alpha > \beta > 0$. For q=1, the estimation is near the arithmetic mean at the center of the probability density function (pdf). For increasing q, the estimate is shifted to the "end" of the pdf. If this estimate is used to setup the delay of a jitter buffer, virtually all packets with a higher delay are lost since they arrive too late for playout. Therefore, increasing q increases the delay estimate, resulting in a higher jitter buffer delay and reduced packet loss due to late packets and vice versa.

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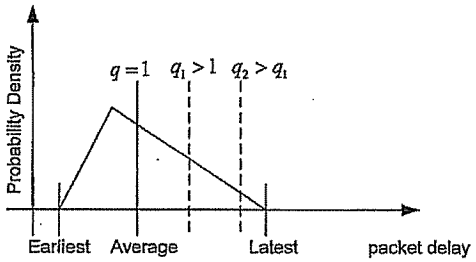

9. Accordingly, it is my opinion that Pang neither expressly nor inherently teaches or suggests an operational relationship where a quotient of the first predefined weight value and the second predefined weight value is selected to define a tradeoff between the delay introduced by the jitter buffer and the packet loss rate, as set forth in the claimed invention.

10. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or of any patent issuing there from.

Dated: May 7th, 2008 By: Wolfgang Bauer

Wolfgang Bauer

RELATED PROCEEDINGS APPENDIX

None.